Copy No. 2

WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT

NO. WAL 710/286

Resistance of Samples of "K Panels" to Perforation by Cal. .45 Steel-Jacketed Ball Projectiles and by the Fragment-Simulator, G-2

BY

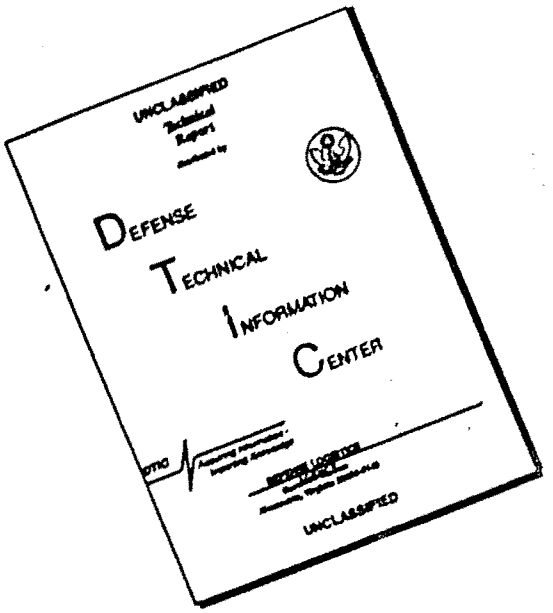
J. F. SULLIVAN
Asst. Engineer

DATE 28 December 1944

WATERTOWN ARSENAL
WATERTOWN, MASS.

SPOBE-38
July 1944

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

Extra Copy

Rump

WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT NO. WAL 710/286

First and Final Report on Problem B-8.12

28 December 1944

Resistance of Samples of "K Panels" to Perforation by Cal. .45 Steel-Jacketed Ball Projectiles and by the Fragment-Simulator, G-2

1. In response to a request of the Office, Chief of Ordnance[1], tests have recently been conducted at this arsenal on several samples of "K panels" submitted by the U. S. Rubber Co., in collaboration with the Reynolds Metals Company.

2. The resistance of these samples (armor panels) to perforation by cal. .45 steel-jacketed ball projectiles and by cal. .22 fragment-simulating projectiles, G-2[2], was so appreciably inferior to that of Hadfield manganese steel of equivalent weight that the weather cycling tests suggested in the authorizing request were considered to be of no interest and were not conducted. → (to p 2)

3. Samples were measured and weighed and the weight/square foot and equivalent thickness of steel determined. The samples were then rigidly mounted on wooden ballistic frames and impacted fairly with cal. .45 steel-jacketed ball projectiles and with cal. .22 fragment-simulating projectiles, G-2. The results are shown in Table I.

4. The resistance of all of these samples was considerably lower than that of Hadfield manganese steel of equivalent weight. Although this fact alone should not disqualify the material from consideration, since it has recently been established that there is a lack of correlation between the ballistic limit tests with these projectiles and service

---

1. O.O. 400.112/14862(c) - Wtn 400.112/3 (c). 29 July 1944

2. WAL 762/253 (c)

cont fr p1

attack, nevertheless it is considered that the theory underlying the fabrication of these samples is not sound from the viewpoint of resistance to perforation. It would be considered much more sound to concentrate the V-board components on the rear side of the aluminum rather than split them equally, sandwiching the aluminum as they have been in the subject sample.

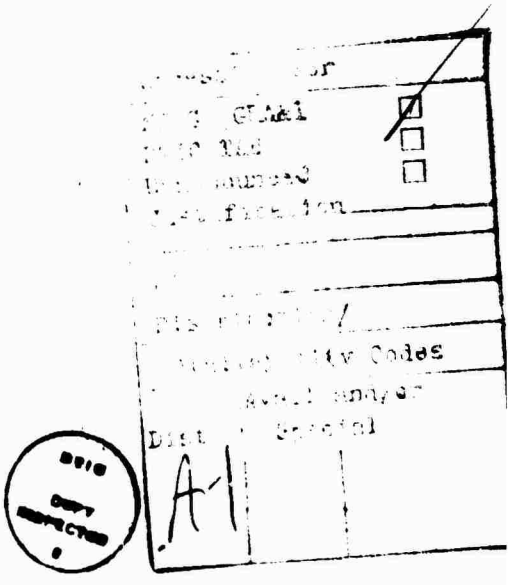
J. F. Sullivan

J. F. SULLIVAN
Asst. Engineer

APPROVED:

E. L. Reed.

E. L. REED
Research Metallurgist
Acting Chief, Armor Section



CONFIDENTIAL

TABLE I

Summary of Ballistic Tests Conducted at Watertown Arsenal on Samples of "K Panels"

Submitted by U. S. Rubber Co.

(September Shipment)

Nominal Make-up		Avg. Compr. Thick.	Wt. Grams	[illegible], Sq. Ft.	Equiv. Steel Thick.	Ballistic Limits Cal. .45[1]	Ballistic Limits Cal. .22[2]
.125"-.051"-.057"	A	.262	1842	1354	.073"	—	1463
	B	.260	1820	1338	.072"	—	1405
	C	.2[illegible]	1844	1355	.073"	—	1570
	D	.2[illegible]5	1841	1353	.073"	—	1440
	F	.26[illegible]	1835	1349	.073"	871	—
	G	.25[illegible]	1815	133[illegible]	.072"	937	—
	H	.256	1811	1331	.072"	940	—
	I	.259	1859	13[illegible]3	.074"	980	—
.072"-.051"-.051"	A	.22	1333	980	.053"	—	1320
	B	.203	1328	976	.053"	—	1328
	C	.213	13[illegible]3	100[illegible]	.054"	—	1365
	D	.207	1329	977	.053"	—	1358
	E	.205	1334	980	.053"	—	1323
	F	.203	1335	981	.053"	757	—
	G	.198	132[illegible]	975	.053"	770	—
	H	.204	1342	93[illegible]	.053"	725	—
	I	.210	1370	1007	.054"	[illegible]	—
	J	.211	1305	959	.052"	837	—
.06[illegible]"-.051"-.051"	A	.199	1270	933	.050"	—	1170
	B	.197	1287	946	.051"	—	1203
	C	.207	1312	964	.052"	—	1208
	D	.204	1309	962	.052"	—	1302
	E	.206	1260	926	.050"	—	1318
	F	.199	1265	930	.050"	725	—
	G	.202	1305	959	.052"	722	—
	H	[illegible]	1273	[illegible]	.05[illegible]"	718	—
	I	[illegible]	[illegible]	[illegible]	.05[illegible]"	771	—
	J	.201	1[illegible]73	936	.[illegible]1"	[illegible]	—
.051"-.0[illegible]"-.064"	A	.208	1[illegible]52	920	.050"	—	1[illegible]3
	B	.193	12[illegible]2	913	.049"	—	11[illegible]7
	C	.204	1258	925	.050"	—	1[illegible]0
	D	.213	1240	911	.049"	—	1255
	E	.207	1199	881	.048"	—	1093
	F	.200	1233	906	.049"	730	—
	G	.201	1232	901	.049"	7[illegible]	—
	H	.200	1242	913	.049"	721	—
	I	.208	1240	911	.049"	7[illegible]	—
	J	.199	1197	880	.048"	778	—
.040"-.064"-.064"	A	.193	11[illegible]0	835	.045"	—	11[illegible]3
	B	.190	1145	[illegible]	.045"	—	1175
	C	.19[illegible]	117[illegible]	[illegible]	.047"	—	1198
	D	.19[illegible]	11[illegible]	[illegible]	.045"	—	112[illegible]
	E	[illegible]	1175	[illegible]	.045"	—	11[illegible]8
	F	.1[illegible]	11[illegible]8	[illegible]	.04[illegible]"	[illegible]	—
	[illegible]	.1[illegible]	11[illegible]8	[illegible]	[illegible]	7[illegible]	—
	H	.193	1173	862	.047"	686	—
	I	.197	1113	818	.044"	[illegible]	—
	J	.190	1125	827	.045"	[illegible]	—
FOR COMPARISON:							
Hadfield manganese steel		—	—	—	.[illegible]5"		1[illegible]75

1. Cal. .45 steel-jacketed ball projectile - 240 gr. [illegible]
2. Cal. .2[illegible] fragment-simulating projectile - 17 gr. [illegible]